

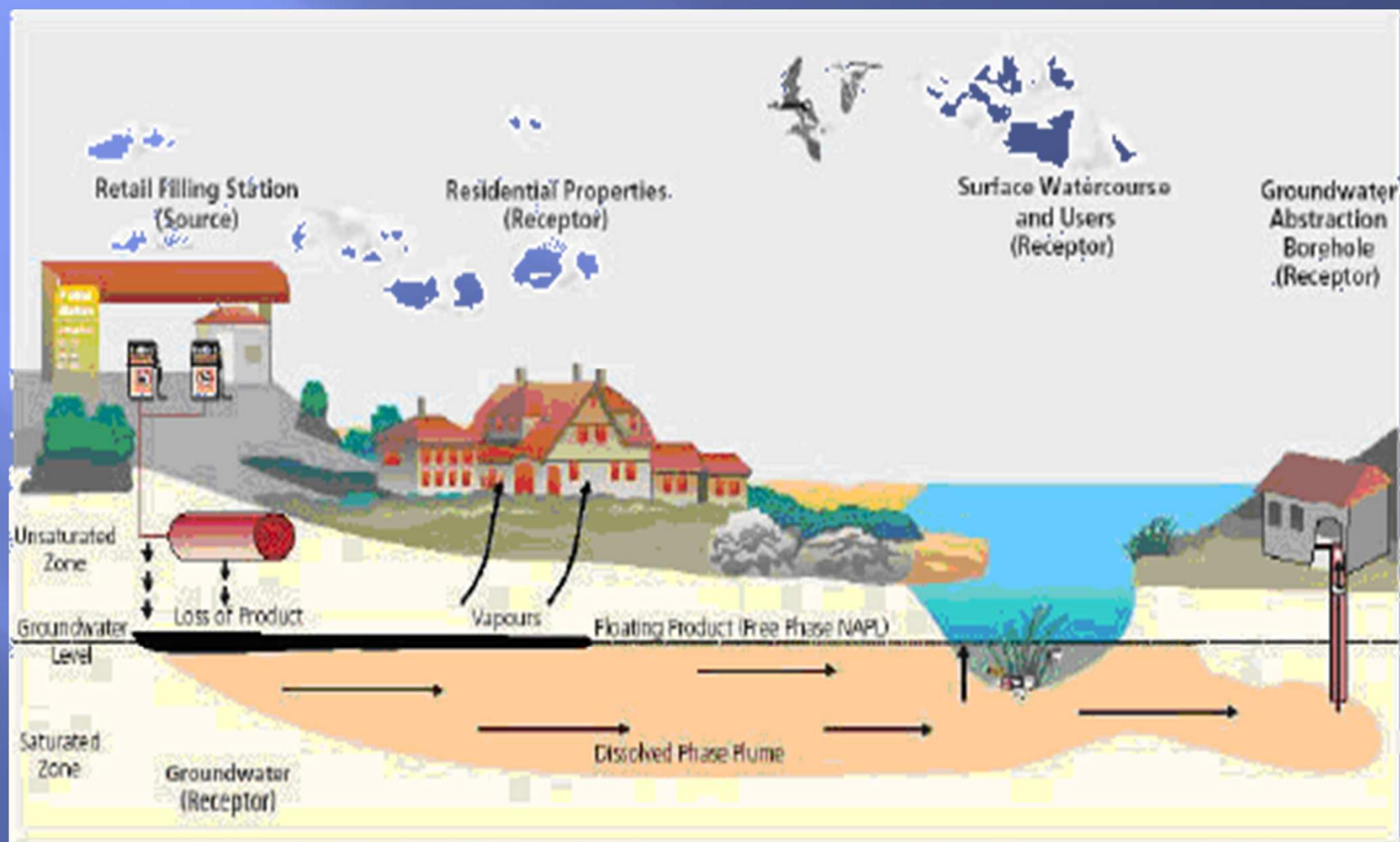
# CONCEPTUAL SITE MODELS FOR PETROLEUM VAPOR INTRUSION

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# CONCEPTUAL SITE MODEL



ASTM's definition:  
Conceptual site model–

noun– a written or pictorial representation of an environmental system and the biological, physical, and chemical processes that determine the transport of contaminants from sources through the environmental media to environmental receptors within the system

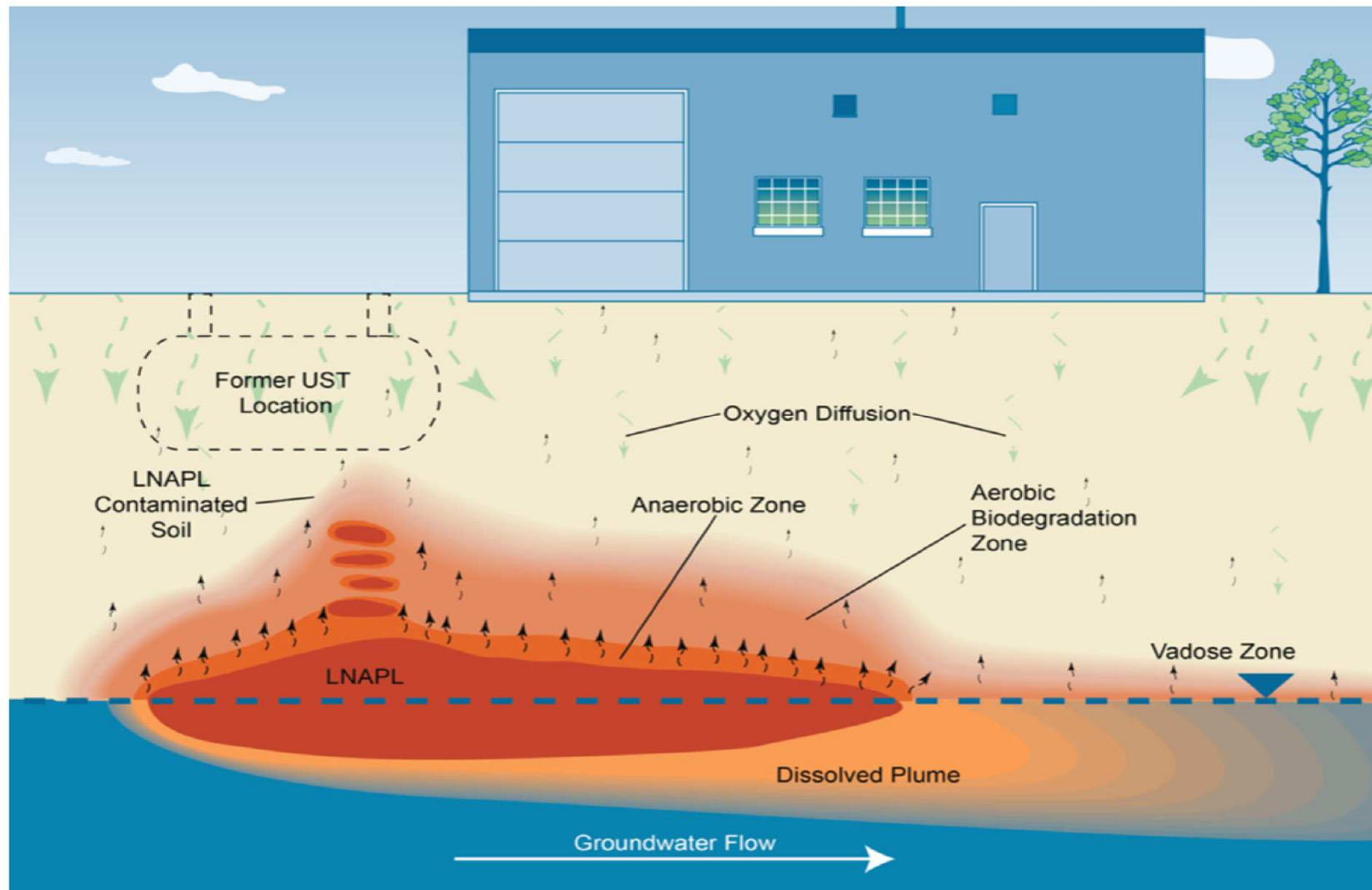
A CSM has to include some write up of the site features, but does not necessarily have to include a picture.

## BASICS OF A CSM

Provides a written and/or pictorial representation of:

- site features
- surface and subsurface conditions
- contaminant and concentrations of concern
- potential pathway exposures

# CONCEPTUAL SITE MODEL



Provided by ITRC, 2013

### WHY BOTHER WITH A CSM?

A CSM is included in the Part 213 Section 21303(f) definition of *RBCA* which directly references the ASTM:



**Standard guide for development of conceptual site models and remediation strategies for light nonaqueous-phase liquids released to the subsurface, designation E 2531–06 E1, which references the**



**Standard guide for development of conceptual site models for Contaminated Sites, designation E 1689–95 (Reapproved 2008)**

# DEQ Guidance Document for the Vapor Intrusion Pathway

May 2013- Remediation & Redevelopment Division

## Section 2: Conceptual Site Model

### Appendix C.2: Checklist for Developing a Conceptual Site Model

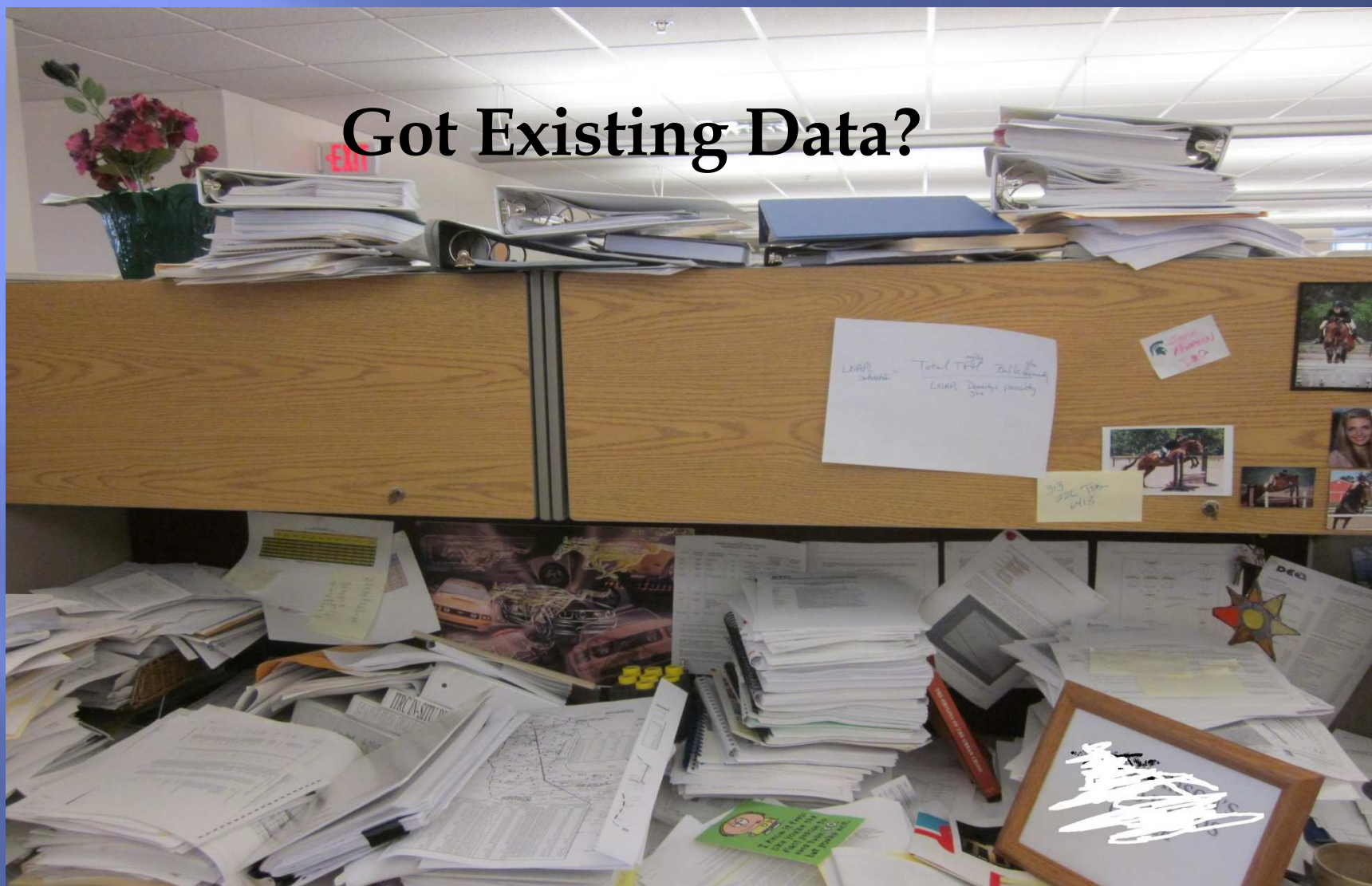
# WHY BOTHER WITH A CSM?

- Illustrative approach allows for easy discussion of risks
- Iterative tool
- Compile multiple sets of data
- Identifies data gaps
- Useful for pathway evaluation

# CONCEPTUAL SITE MODEL



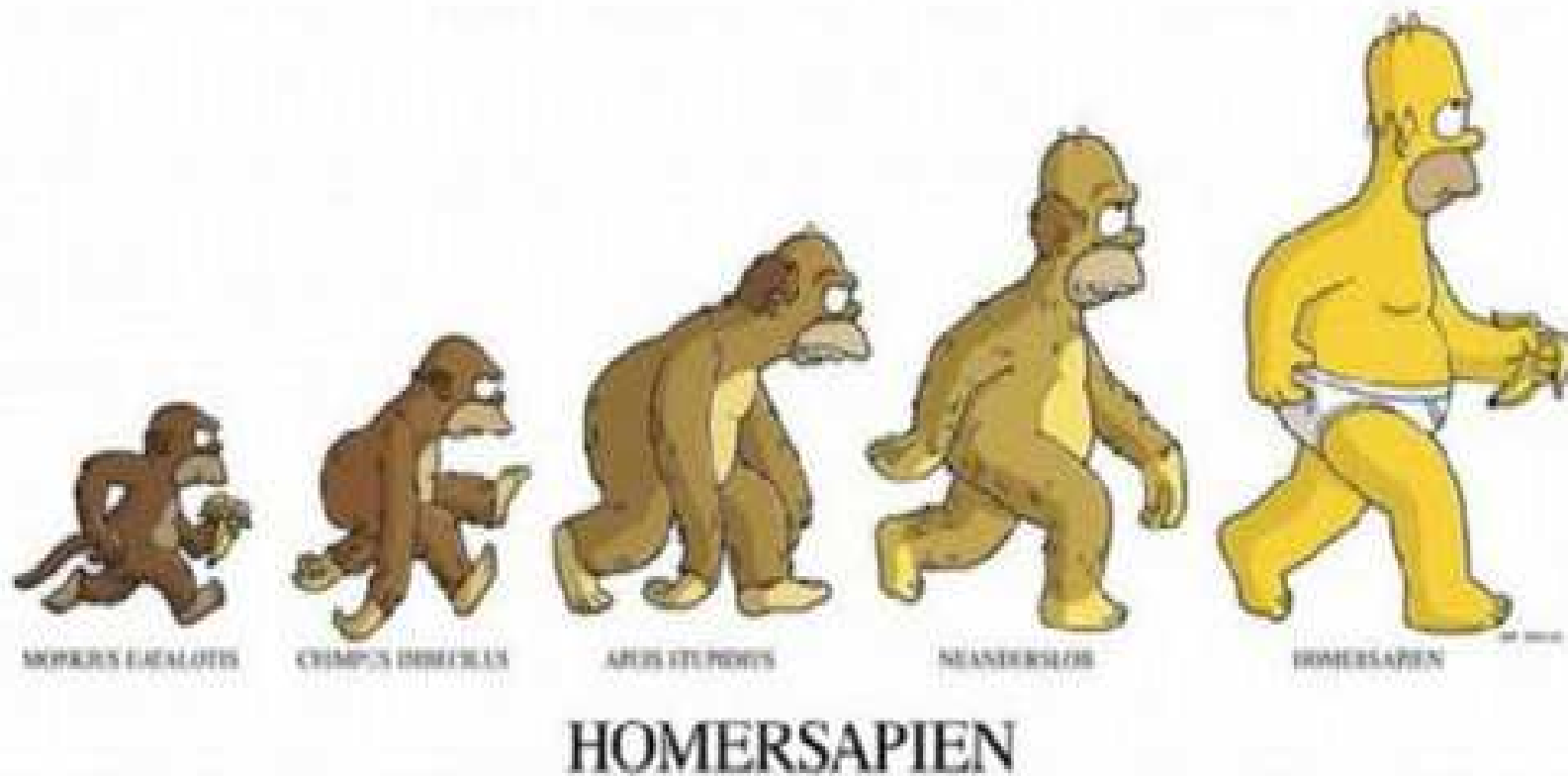
Got Existing Data?



## CONCEPTUAL SITE MODEL



The CSM is an EVOLVING document.



## CSM CHECKLIST:

### 1.0 UTILITIES AND PROCESS PIPING

\_\_\_\_\_ Maps, figures, and cross-sections of the building provide the location and depths of all underground utilities and/or process piping near the soil or groundwater impacts.

### 2.0 BUILDINGS (RECEPTORS)

\_\_\_\_\_ Maps identify:

Existing or proposed buildings, Vacant parcels, Property boundaries

\_\_\_\_\_ Description of the occupancy and use of all properties/buildings

\_\_\_\_\_ Construction of each structure includes (if applicable):

General construction style (e.g., basement, crawlspace, slab on grade)

Floor construction (e.g., concrete, dirt)

Depth below grade of lowest floor

Building layout (e.g., large and open, small rooms)

Height (and number of floors)

Sumps or foundation drains

Alternate ventilation system

Elevator(s)

\_\_\_\_\_ Heating, ventilation or air conditioning system in each structure is described

\_\_\_\_\_ Installed sub-slab ventilation systems or moisture barriers present are described and identified on all building figures

## 3.0 SOURCE AREA(S)

\_\_\_\_\_ Description and known history of the release.

\_\_\_\_\_ Maps and figures identify and show the location of all vapor source(s) in relation to each structure (including the presence, distribution, and composition of any non-aqueous phase liquid at the site).

\_\_\_\_\_ Cross-sections showing example building, construction styles, and relationship to source of vapors (actual number will vary as appropriate).

\_\_\_\_\_ Description of the potential migration characteristics (e.g., stable, increasing, decreasing).

## GEOLOGY/HYDROGEOLOGY

\_\_\_\_ Maps, figures, cross-sections, and/or description identify soil lithology and characteristics:

Heterogeneity/homogeneity of soils and the lithologic units encountered including:

Depth and lateral continuity of any confining units that may impede contaminant migration

Depth and lateral continuity of any highly transmissive units that may enhance contaminant

migration

Depth of vadose zone, capillary fringe, and phreatic zone including:

Any seasonal water table fluctuations

Groundwater flow direction

Presence of any perched groundwater

Note where the water table intersects the well screen interval or the presence of a submerged

screen.

\_\_\_\_ Description and location of distinct strata (soil type and moisture content, e.g., moist, wet, dry) and the depth intervals.

\_\_\_\_ Description and location of all fill or non-native materials.

\_\_\_\_ Depth to groundwater identified on all cross-sections.

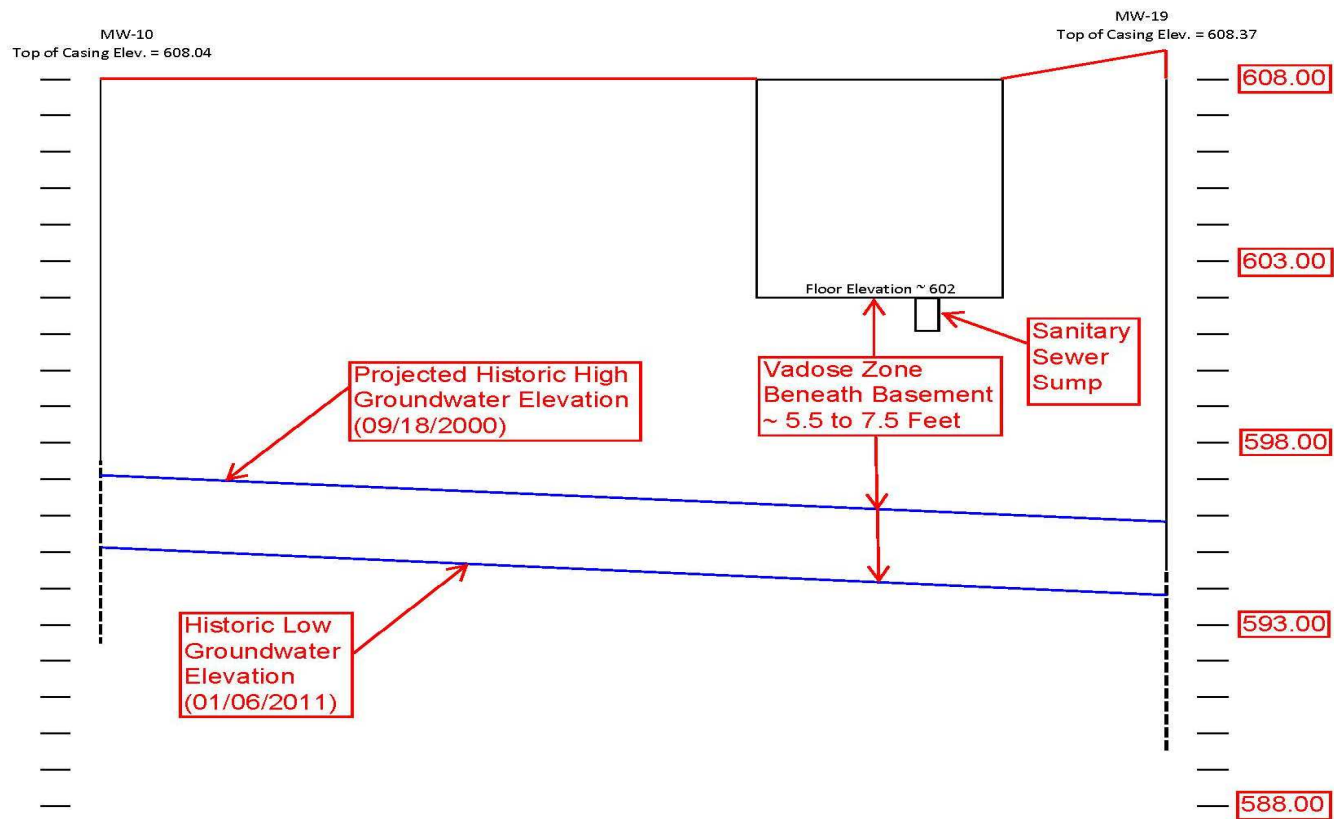
\_\_\_\_ General groundwater characteristics provided (e.g., seasonal fluctuation, hydraulic gradient).

## SITE CHARACTERISTICS

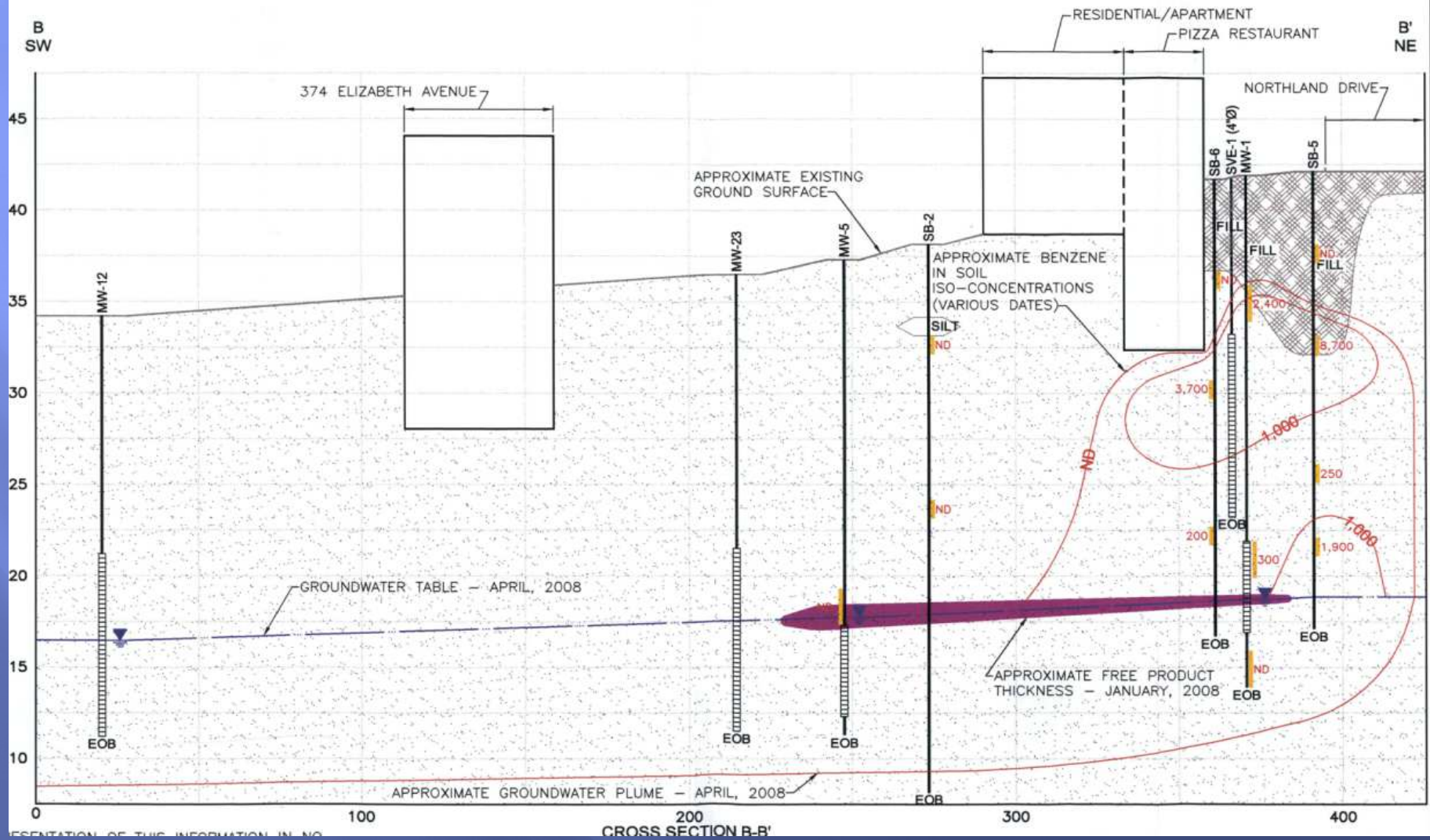
\_\_\_\_\_ Map of the site (to scale) showing all paved areas, surface cover, locations of all structures, and ground cover.

\_\_\_\_\_ Map identifying all potential sources of vapors.

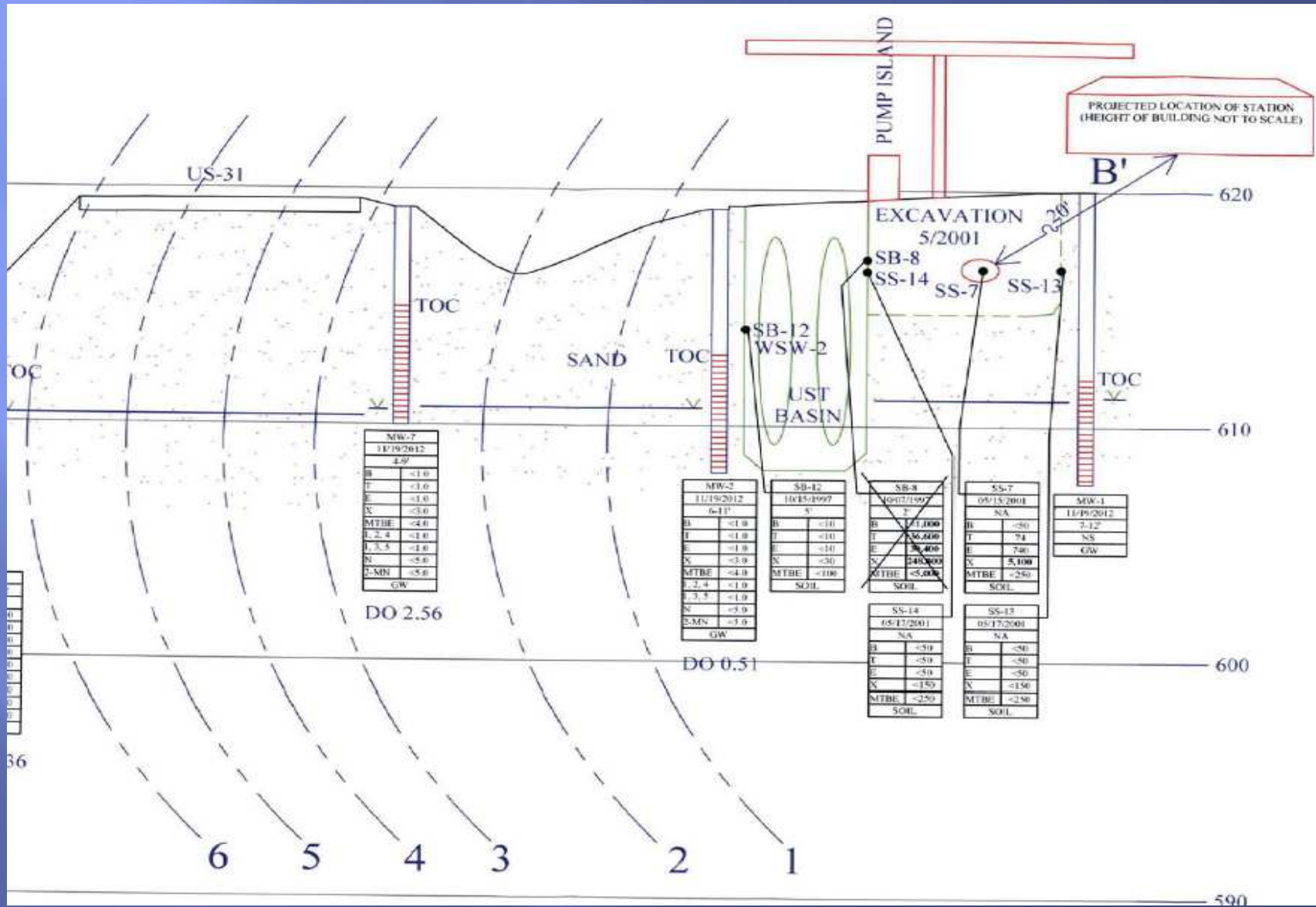
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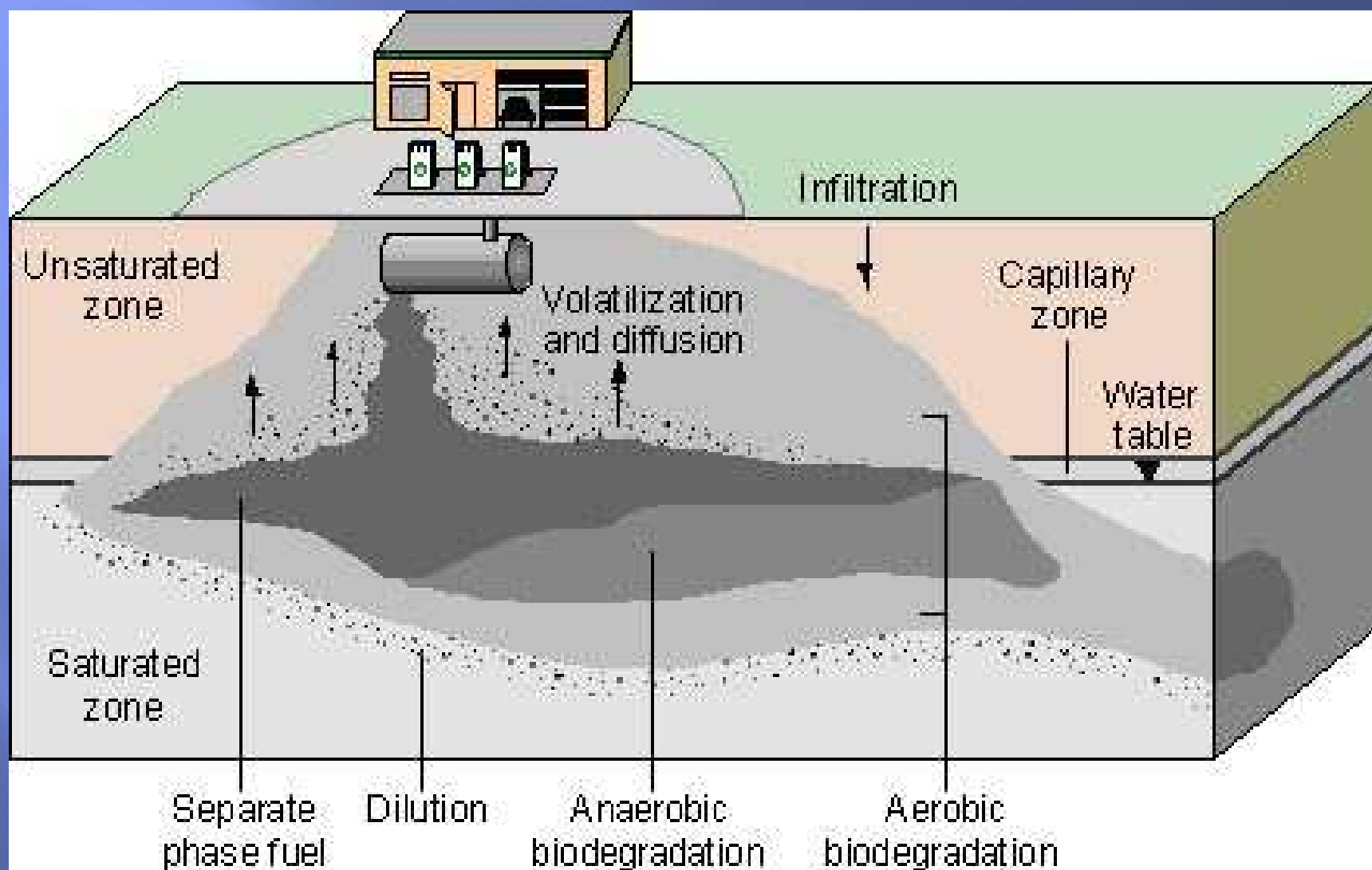
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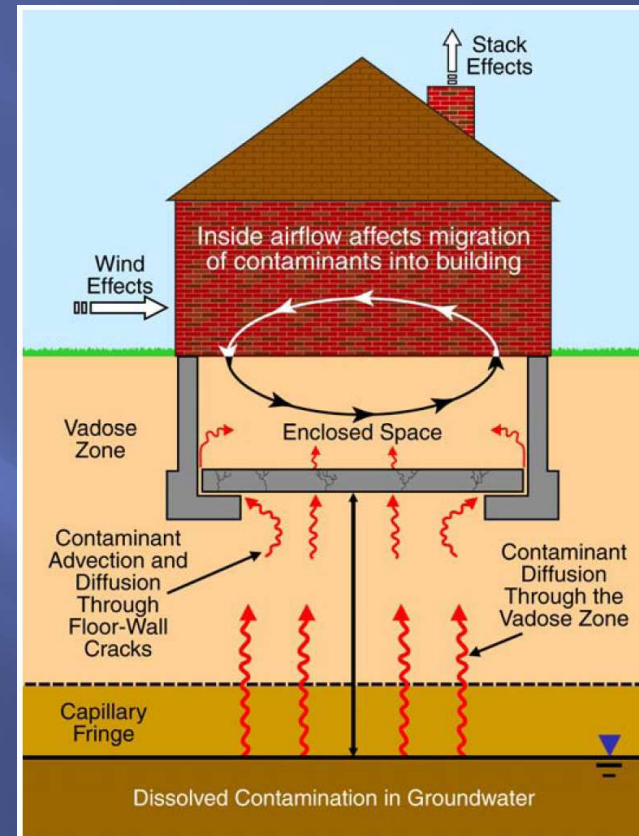
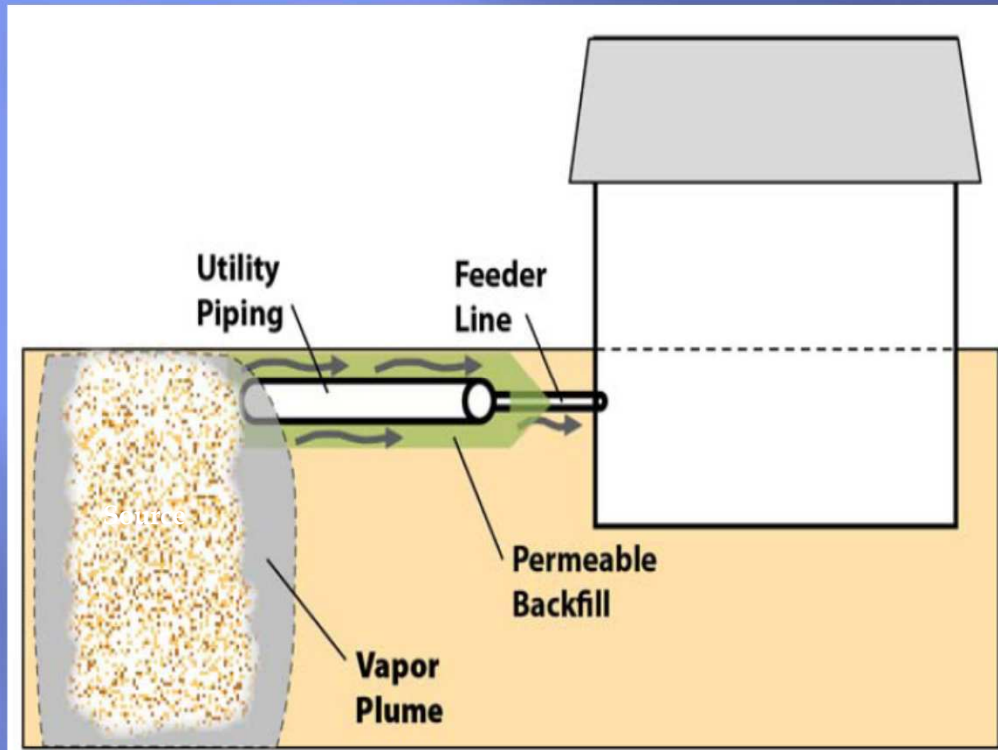
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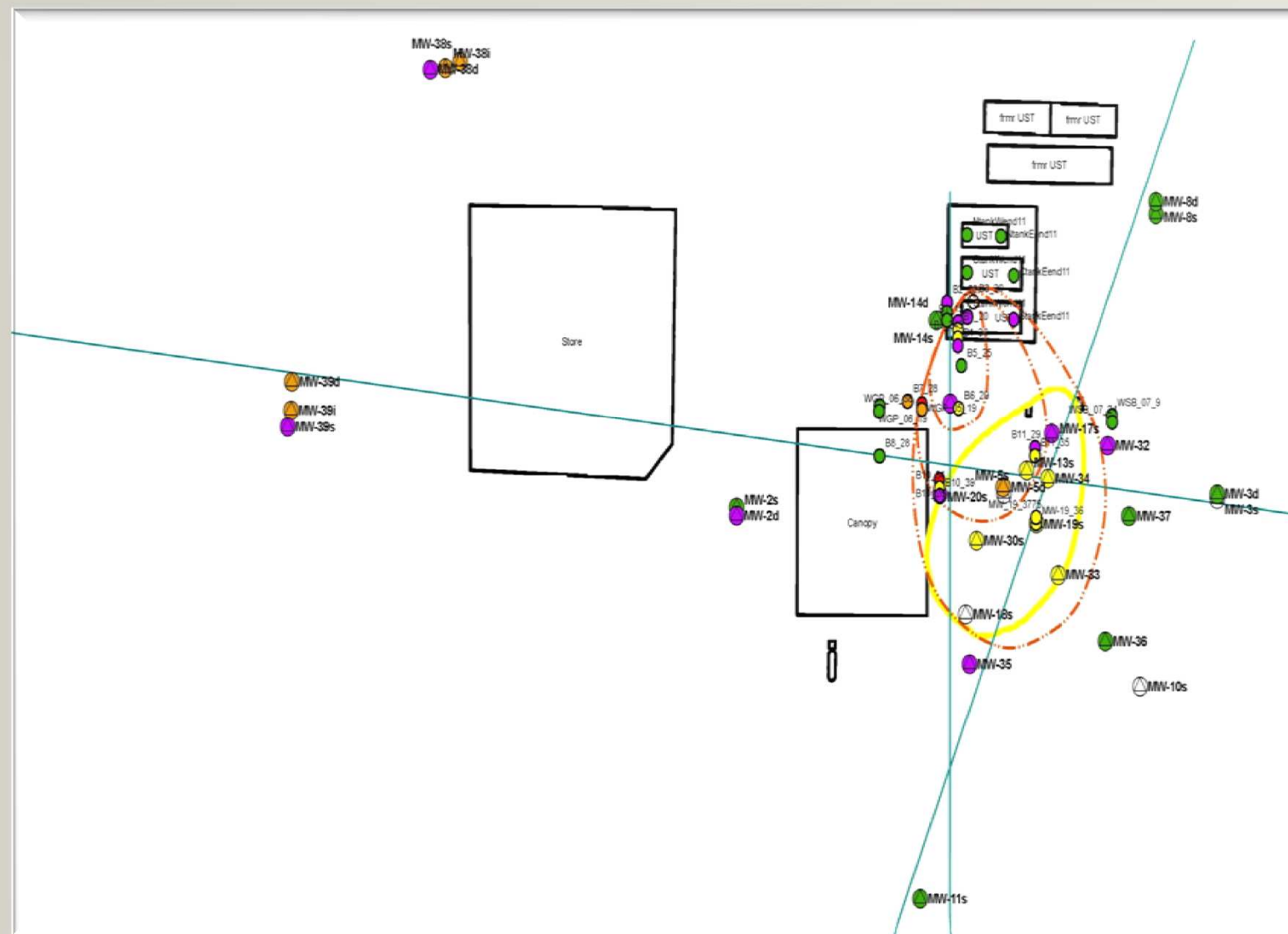


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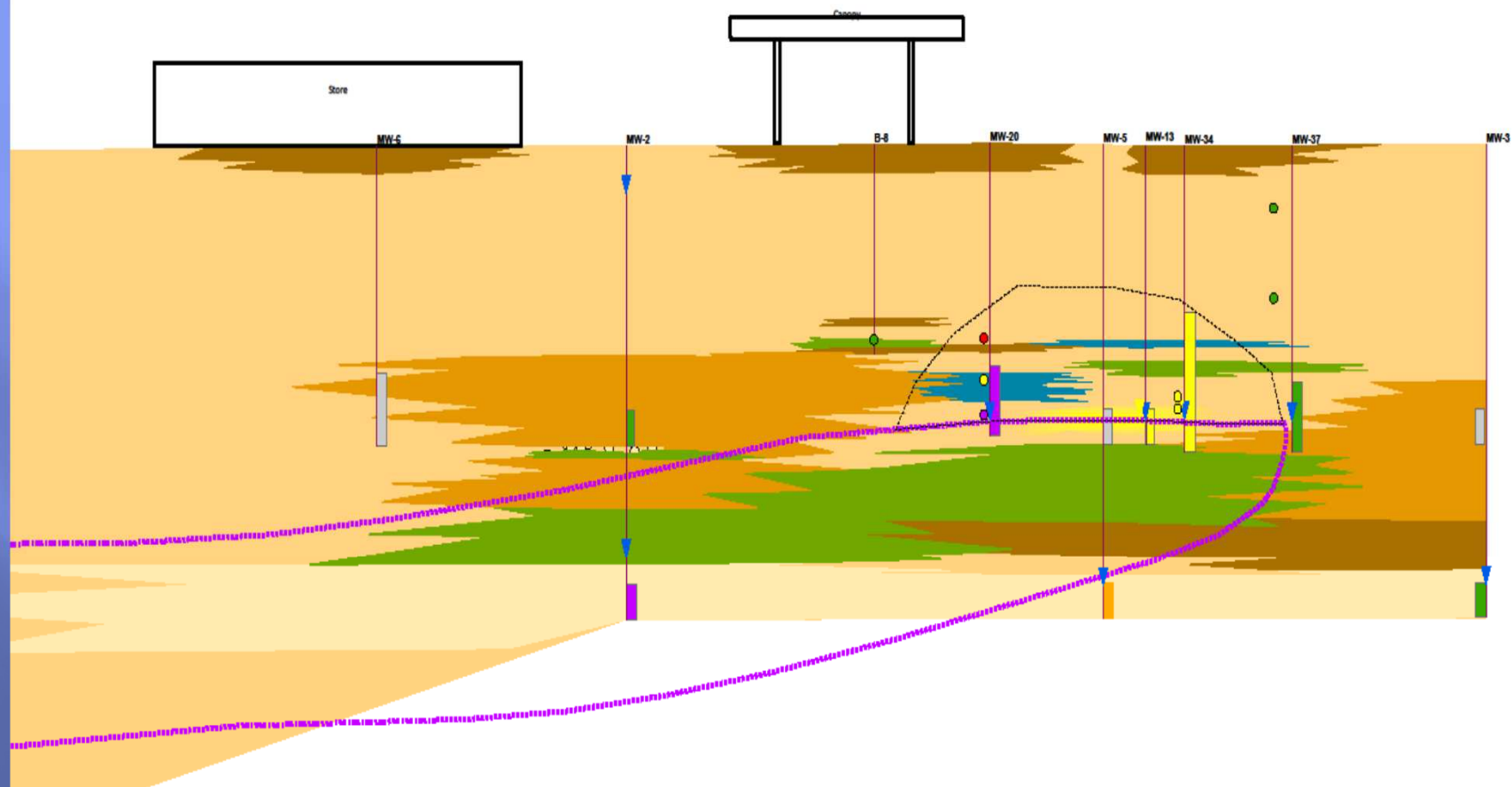




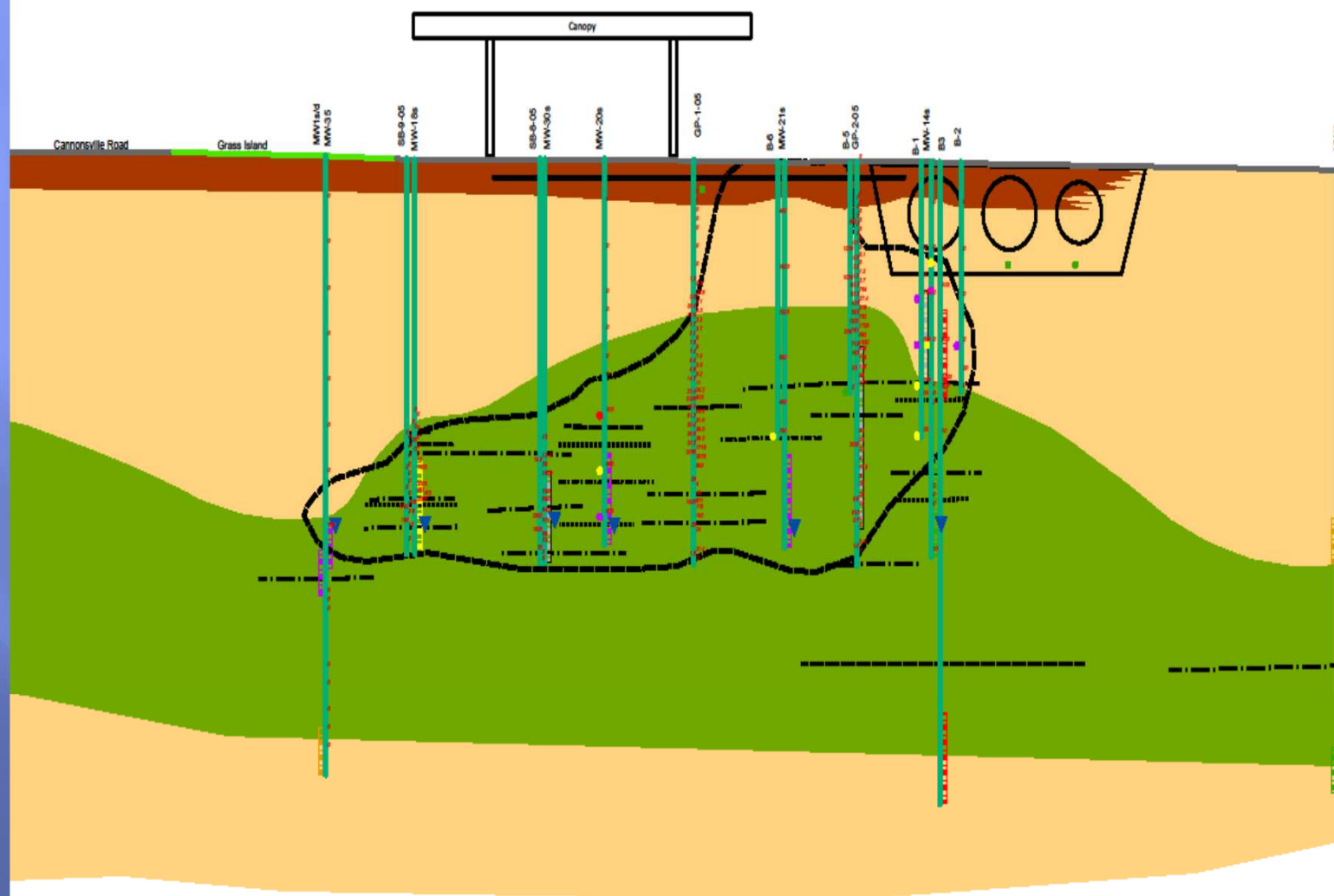
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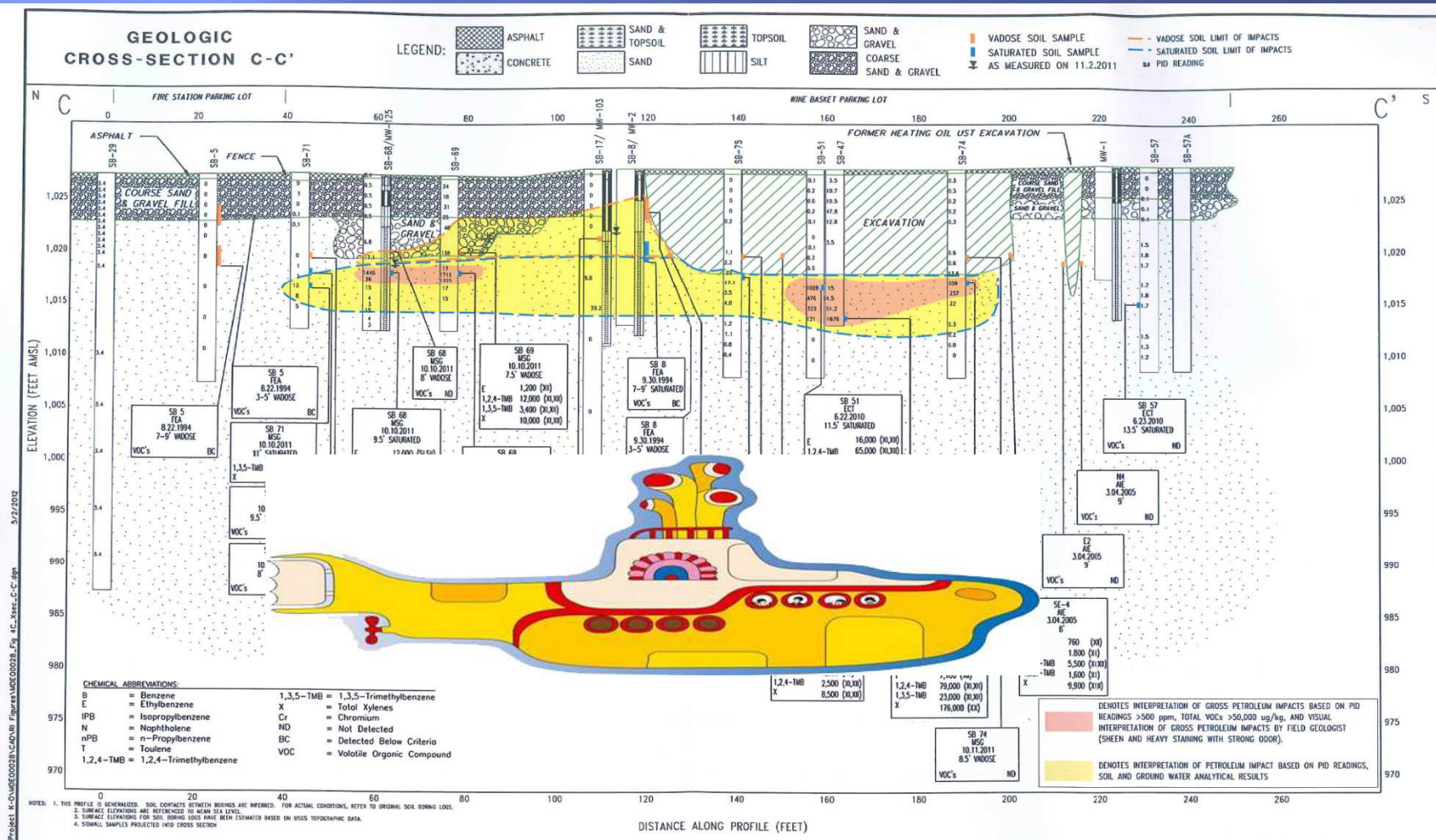


## CONCEPTUAL SITE MODEL



Just for fun....

# CONCEPTUAL SITE MODEL



Thank You!